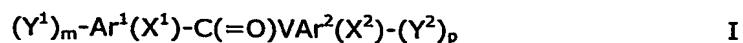


## CLAIMS

## 1. A compound of the general formula I



wherein

5 V designates  $-CH_2-CH_2-$ ,  $-CH=CH-$  or  $-C\equiv C-$ ;

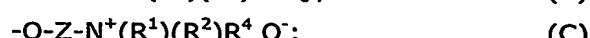
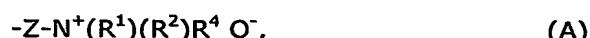
Ar<sup>1</sup> and Ar<sup>2</sup> independently are selected from aryl and heteroaryl;

m is an integer selected from the group consisting of 0, 1, and 2,

p is an integer selected from the group consisting of 0, 1, and 2,

wherein the sum of m and p is at least 1;

10 each Y<sup>1</sup> and Y<sup>2</sup> independently represents a substituent selected from A, B, and C



wherein Z is a biradical  $-(C(R^H)_2)_n-$ , wherein n is an integer in the range of 1-6 and each R<sup>H</sup> is 15 independently selected from hydrogen and C<sub>1-6</sub>-alkyl, or wherein  $(R^H)_2$  is =O;

R<sup>1</sup>, R<sup>2</sup> and R<sup>4</sup> independently are selected from optionally substituted C<sub>1-12</sub>-alkyl, optionally substituted C<sub>2-12</sub>-alkenyl, optionally substituted C<sub>4-12</sub>-alkadienyl, optionally substituted C<sub>6-12</sub>-alkatrienyl, optionally substituted C<sub>2-12</sub>-alkynyl, optionally substituted C<sub>1-12</sub>-alkoxycarbonyl, 20 optionally substituted C<sub>1-12</sub>-alkylcarbonyl, optionally substituted aryl, optionally substituted aryloxycarbonyl, optionally substituted arylcarbonyl, optionally substituted heteroaryl, optionally substituted heteroaryloxycarbonyl, optionally substituted heteroarylcarbonyl, aminocarbonyl, mono- and di(C<sub>1-6</sub>-alkyl)aminocarbonyl, amino-C<sub>1-6</sub>-alkyl-aminocarbonyl, mono- and di(C<sub>1-6</sub>-alkyl)amino-C<sub>1-6</sub>-alkyl-aminocarbonyl; or R<sup>1</sup> and R<sup>2</sup> together with the 25 nitrogen atom to which they are attached (-N(R<sup>1</sup>)R<sup>2</sup>) form an optionally substituted nitrogen-containing heterocyclic ring;

R<sup>3</sup> is selected from hydrogen, C<sub>1-6</sub>-alkyl, and C<sub>1-6</sub>-alkylcarbonyl, said alkyl and alkylcarbonyl 30 optionally carrying substituent(s) selected from halogen, hydroxy, C<sub>1-6</sub>-alkoxy, carboxy, C<sub>1-6</sub>-alkoxycarbonyl, C<sub>1-6</sub>-alkylcarbonyl, amino, mono- and di(C<sub>1-6</sub>-alkyl)amino, and aryl optionally substituted 1-3 times with C<sub>1-4</sub>-alkyl, C<sub>1-4</sub>-alkoxy, nitro, cyano, amino or halogen; or R<sup>1</sup> and R<sup>3</sup> together form a biradical Z\* which is as defined for Z;

Q is an anion;

X<sup>1</sup> and X<sup>2</sup> independently designate a substituent present 0-5 times on Ar<sup>1</sup> and Ar<sup>2</sup>, respectively, each X<sup>1</sup> and X<sup>2</sup> independently being selected from the group consisting of optionally substituted C<sub>1-12</sub>-alkyl, optionally substituted C<sub>2-12</sub>-alkenyl, optionally substituted

5 C<sub>4-12</sub>-alkadienyl, optionally substituted C<sub>6-12</sub>-alkatrienyl, optionally substituted C<sub>2-12</sub>-alkynyl, hydroxy, optionally substituted C<sub>1-12</sub>-alkoxy, optionally substituted C<sub>2-12</sub>-alkenyloxy, carboxy, optionally substituted C<sub>1-12</sub>-alkoxycarbonyl, optionally substituted C<sub>1-12</sub>-alkylcarbonyl, formyl, C<sub>1-6</sub>-alkylsulphonylamino, optionally substituted aryl, optionally substituted aryloxycarbonyl, optionally substituted aryloxy, optionally substituted arylcarbonyl, optionally substituted 10 arylamino, arylsulphonylamino, optionally substituted heteroaryl, optionally substituted heteroaryloxycarbonyl, optionally substituted heteroaryloxy, optionally substituted heteroarylcarbonyl, optionally substituted heteroarylaminino, heteroarylsulphonylamino, optionally substituted heterocyclyl, optionally substituted heterocyclloxycarbonyl, optionally substituted heterocyclloxy, optionally substituted heterocyclcarbonyl, optionally 15 substituted heterocyclamino, heterocyclsulphonylamino, amino, mono- and di(C<sub>1-6</sub>-alkyl)amino, carbamoyl, mono- and di(C<sub>1-6</sub>-alkyl)aminocarbonyl, amino-C<sub>1-6</sub>-alkyl-aminocarbonyl, mono- and di(C<sub>1-6</sub>-alkyl)amino-C<sub>1-6</sub>-alkyl-aminocarbonyl, C<sub>1-6</sub>-alkylcarbonylamino, amino-C<sub>1-6</sub>-alkyl-carbonylamino, mono- and di(C<sub>1-6</sub>-alkyl)amino-C<sub>1-6</sub>-alkyl-carbonylamino, 20 cyano, guanidino, carbamido, C<sub>1-6</sub>-alkanoyloxy, C<sub>1-6</sub>-alkylsulphonyl, C<sub>1-6</sub>-alkylsulphiny, C<sub>1-6</sub>-alkylsulphonyloxy, aminosulfonyl, mono- and di(C<sub>1-6</sub>-alkyl)aminosulfonyl, nitro, optionally substituted C<sub>1-6</sub>-alkylthio, and halogen, where any nitrogen-bound C<sub>1-6</sub>-alkyl is optionally substituted with hydroxy, C<sub>1-6</sub>-alkoxy, C<sub>2-6</sub>-alkenyloxy, amino, mono- and di(C<sub>1-6</sub>-alkyl)amino, carboxy, C<sub>1-6</sub>-alkylcarbonylamino, halogen, C<sub>1-6</sub>-alkylthio, C<sub>1-6</sub>-alkyl-sulphonyl-amino, or guanidino;

25 and salts thereof.

2. The compound according to claim 1, wherein R<sup>1</sup>, R<sup>2</sup> and R<sup>4</sup> independently are selected from optionally substituted C<sub>1-12</sub>-alkyl, optionally substituted C<sub>2-12</sub>-alkenyl, optionally substituted C<sub>2-12</sub>-alkynyl, optionally substituted C<sub>1-12</sub>-alkylcarbonyl, arylcarbonyl, heteroarylcarbonyl, aminocarbonyl, mono- and di(C<sub>1-6</sub>-alkyl)aminocarbonyl, amino-C<sub>1-6</sub>-alkyl-aminocarbonyl, and mono- and di(C<sub>1-6</sub>-alkyl)amino-C<sub>1-6</sub>-alkyl-aminocarbonyl.

3. The compound according to any of the preceding claims, wherein R<sup>3</sup> is selected from hydrogen and methyl.

4. The compound according to any of the preceding claims, wherein X<sup>1</sup> and X<sup>2</sup> independently designates 0-4 substituents, where such optional substituents independently are selected 35 from optionally substituted C<sub>1-12</sub>-alkyl, hydroxy, optionally substituted C<sub>1-12</sub>-alkoxy, optionally

substituted  $C_{2-12}$ -alkenyloxy, carboxy, optionally substituted  $C_{1-12}$ -alkylcarbonyl, formyl,  $C_{1-6}$ -alkylsulphonylamino, optionally substituted aryl, optionally substituted aryloxycarbonyl, optionally substituted aryloxy, optionally substituted arylcarbonyl, optionally substituted arylamino, arylsulphonylamino, optionally substituted heteroaryl, optionally substituted heteroaryl, optionally substituted heteroarylcarbonyl, optionally substituted heteroaryloxy, heteroarylsulphonylamino, optionally substituted heterocyclyl, optionally substituted heterocyclyloxy, optionally substituted heterocyclamino, amino, mono- and di( $C_{1-6}$ -alkyl)amino, carbamoyl, mono- and di( $C_{1-6}$ -alkyl)aminocarbonyl, amino- $C_{1-6}$ -alkyl-aminocarbonyl, mono- and di( $C_{1-6}$ -alkyl)amino- $C_{1-6}$ -alkyl-aminocarbonyl,  $C_{1-6}$ -alkylcarbonylamino, amino- $C_{1-6}$ -alkyl-carbonylamino, mono- and di( $C_{1-6}$ -alkyl)amino- $C_{1-6}$ -alkyl-carbonylamino, guanidino, carbamido,  $C_{1-6}$ -alkylsulphonyl,  $C_{1-6}$ -alkylsulphiny,  $C_{1-6}$ -alkylsulphonyloxy, optionally substituted  $C_{1-6}$ -alkylthio, aminosulfonyl, mono- and di( $C_{1-6}$ -alkyl)aminosulfonyl, and halogen, where any nitrogen-bound  $C_{1-6}$ -alkyl may be substituted with a substituent selected from the group consisting of hydroxy,  $C_{1-6}$ -alkoxy, and halogen.

5. The compound according to any of the preceding claims, wherein  $R^1$ ,  $R^2$  and  $R^4$  independently are selected from optionally substituted  $C_{1-6}$ -alkyl, optionally substituted  $C_{1-6}$ -alkylcarbonyl, heteroarylcarbonyl, aminocarbonyl, mono- and di( $C_{1-6}$ -alkyl)aminocarbonyl, amino- $C_{1-6}$ -alkyl-aminocarbonyl, and mono- and di( $C_{1-6}$ -alkyl)amino- $C_{1-6}$ -alkyl-aminocarbonyl.

6. The compound according to any of the preceding claims, wherein  $X^1$  and  $X^2$  independently designate 0-3 substituents, such optional substituents independently being selected from optionally substituted  $C_{1-6}$ -alkyl, hydroxy, optionally substituted  $C_{1-6}$ -alkoxy, carboxy, optionally substituted  $C_{1-6}$ -alkylcarbonyl,  $C_{1-6}$ -alkylsulphonylamino, optionally substituted aryl, optionally substituted aryloxy, optionally substituted arylamino, arylsulphonylamino, optionally substituted heteroaryl, optionally substituted heteroaryl, optionally substituted heteroaryl, amino, mono- and di( $C_{1-6}$ -alkyl)amino, carbamoyl,  $C_{1-6}$ -alkyl-carbonylamino, guanidino, carbamido, optionally substituted  $C_{1-6}$ -alkylthio, optionally substituted heterocyclyl, optionally substituted heterocyclyloxy, optionally substituted heterocyclamino and halogen, where any nitrogen-bound  $C_{1-6}$ -alkyl may be substituted with a substituent selected from the group consisting of hydroxy,  $C_{1-6}$ -alkoxy, and halogen.

20. 7. The compound according to any of the preceding claims, wherein V designates  $-CH=CH-$ .

8. The compound according to any of the preceding claims, wherein at least one of  $Ar^1$  and  $Ar^2$  is phenyl.

25. 9. The compound according to claim 8, wherein both of  $Ar^1$  and  $Ar^2$  are phenyl, m is 1 or 2, and p is 0, 1 or 2.

10. The compound according to any of the preceding claims, wherein  $X^2$  represents at least one substituent selected from  $C_{1-6}$ -alkyl,  $C_{1-6}$ -alkoxy,  $C_{1-6}$ -alkylcarbonyl, optionally substituted aryl, optionally substituted aryloxy, optionally substituted arylamino, optionally substituted heteroaryl, optionally substituted heteroaryl amino, mono- and di( $C_{1-6}$ -alkyl)amino,  $C_{1-6}$ -alkyl-carbonylamino, optionally substituted  $C_{1-6}$ -alkylthio, optionally substituted heterocyclyl, 5 optionally substituted heterocyclyloxy, optionally substituted heterocyclamino and halogen.

11. The compound according to any of the preceding claims, wherein  $X^2$  represents at least two halogen atoms.

12. The compound according to any of claims 1-8 and 10-11, wherein at least one of  $Ar^1$  and 10  $Ar^2$  is selected from the group consisting of thiazolyl, pyrrolyl, imidazolyl, pyrazolyl, pyridinyl, pyrimidinyl, pyrazinyl, pyridazinyl, thienyl, quinolyl, isoquinolyl, and indolyl.

13. The compound according to any of the preceding claims, wherein  $Z$  is  $-(CH_2)_n-$ , wherein  $n$  is 1-4.

14. The compound according to any of the preceding claims, wherein one of  $Y^1$  and  $Y^2$  15 represents a substituent of the formula A



wherein  $R^1$ ,  $R^2$  and  $R^4$  are independently  $C_{1-6}$ -alkyl.

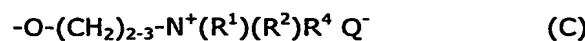
15. The compound according to any of claims 13-14, wherein  $Y^1$  represents a substituent of the formula  $-CH_2-N^+(R^1)(R^2)R^4 Q^-$ .

20 16. The compound according to any of the preceding claims, wherein one of  $Y^1$  and  $Y^2$  represents a substituent of the formula B



wherein  $R^3$  is selected from hydrogen and methyl, and  $R^1$ ,  $R^2$  and  $R^4$  are independently  $C_{1-6}$ -alkyl.

25 17. The compound according to any of the preceding claims, wherein one of  $Y^1$  and  $Y^2$  represents a substituent of the formula C



wherein  $R^1$ ,  $R^2$  and  $R^4$  are independently  $C_{1-6}$ -alkyl.

18. The compound according to any of claims 14-17, wherein V is -CH=CH-, and Ar<sup>1</sup> and Ar<sup>2</sup> both are phenyl.

19. The compound according to claim 1, which is selected from the group consisting of:

(2-{3-[3-(2-Chloro-4-methoxy-phenyl)-3-oxo-propenyl]-3',5'-dimethyl-biphenyl-4-yloxy}-

5 ethyl)-trimethyl-ammonium, iodide;

(2-{3-[3-(4-Amino-phenyl)-3-oxo-propenyl]-3',5'-dimethyl-biphenyl-4-yloxy}-ethyl)-trimethyl-ammonium, iodide;

(2-{3-[3-(2-Amino-phenyl)-3-oxo-propenyl]-3',5'-dimethyl-biphenyl-4-yloxy}-ethyl)-trimethyl-ammonium, iodide;

10 4-{3-[3-(2-Fluoro-4-methoxy-phenyl)-3-oxo-propenyl]-2'-methoxy-biphenyl-4-yl}-1,1-dimethyl-piperazin-1-ium, iodide;

{3-[3-(4-Dibutylamino-phenyl)-acryloyl]-benzyl}-trimethyl-ammonium, iodide;

3-[4-(2-Trimethylammonium-ethoxy)-biphenyl-3-yl]-1-(3-trimethylammonium-phenyl)-propenone, di-iodide; and

15 3-[4-(2-trimethylammonium-ethoxy)-3',5'-dimethyl-biphenyl-3-yl]-1-(2-trimethylammonium-4-methoxy-phenyl)-propenone, di-iodide.

20. A pharmaceutical composition comprising a compound as defined in any of the claims 1-19 in combination with a pharmaceutically acceptable carrier.

21. A compound as defined in any of the claims 1-19 for use as a drug substance.

20 22. Use of a compound as defined in any of the claims 1-19, for the preparation of a pharmaceutical composition for the treatment of bacterial infections.

23. The use according to claim 22, wherein the bacterial infection is associated with bacteria selected from the group consisting of Gram-positive bacteria, Gram-negative bacteria, microaerophilic bacteria and anaerobic bacteria.

25 24. The use according to claim 23, wherein the bacteria is a microaerophilic bacteria associated with gastric disease, such as *Helicobacter pylori*.

25. The use according to claim 23, wherein the bacteria is selected from antibiotic-sensitive and -resistant strains of *S.aureus*.

30 26. The use according to claim 23, wherein the bacteria is selected from antibiotic-sensitive and -resistant strains of *E.faecium*.

27. The use according to claim 23, wherein the bacteria is selected from a *S.pneumoniae* and *S.pyogenes*.

28. The use according to claim 23, wherein the bacteria is a member of *Enterobacteriaceae*, e.g. *E.coli*.

5 29. The use according to claim 23, wherein the bacteria is a pathogenic anaerobic bacteria, such as *Bacteroides fragilis* or *Clostridium species*.

30. A method for the preparation of a compound of the general formula I as defined in any of claims 1-19 wherein V is -CH=CH-, comprising the steps

10 (a) combining a ketone derivative of formula  $(Y^3)_m\text{-Ar}_1(X^1)\text{-C}(=O)\text{-CH}_3$  with an aldehyde derivative of formula  $\text{HCO-Ar}^2(X^2)\text{-(Y}^4\text{)}_p$  so as to form a mixture, whereby a compound of the general formula II

$$(Y^3)_m\text{-Ar}^1(X^1)\text{-C}(=O)\text{VAr}^2(X^2)\text{-(Y}^4\text{)}_p \quad \text{II}$$

wherein  $\text{Ar}^1$ ,  $\text{Ar}^2$ ,  $X^1$ ,  $X^2$ , V, m and p are as defined in claim 1, and wherein each  $Y^3$  and  $Y^4$  independently represents a substituent selected from A', B', and C'

15 -Z-N(R<sup>1</sup>)R<sup>2</sup>, (A')  
-NR<sup>3</sup>-Z-N(R<sup>1</sup>)R<sup>2</sup>, and (B')  
-O-Z-N(R<sup>1</sup>)R<sup>2</sup>; (C')

wherein Z, R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are as defined in claim 1;

is obtained; and

20 (b) treating the compound of the general formula II with an alkylating agent or an acylating agent so as to obtain the compound of the general formula I

$$(Y^1)_m\text{-Ar}^1(X^1)\text{-C}(=O)\text{VAr}^2(X^2)\text{-(Y}^2\text{)}_p \quad \text{I.}$$

31. A method for treating bacterial infections in a mammal comprising administration of a compound as defined in any of claims 1-19.

25 32. The method according to claim 31, wherein the bacterial infection is associated with bacteria selected from Gram-positive bacteria, Gram-negative bacteria, microaerophilic bacteria and anaerobic bacteria.

33. The method according to claim 32, wherein the bacteria is a microaerophilic bacteria, associated with gastric disease, such as *Helicobacter pylori*.

34. The method according to claim 32, wherein the bacteria is selected from antibiotic-sensitive and -resistant strains of *S.aureus*.

5 35. The method according to claim 32, wherein the bacteria is selected from antibiotic-sensitive and -resistant strains of *E.faecium*.

36. The method according to claim 32, wherein the bacteria is selected from *S.pneumoniae* and *S.pyogenes*.

37. The method according to claim 32, wherein the bacteria is a member of  
10 *Enterobacteriaceae*, e.g. *E.coli*.

38. The method according to claim 32, wherein the bacteria is a pathogenic anaerobic bacteria, such as *Bacteroides fragilis* or *Clostridium species*.